

Sheldrake, Sean

From: Sheldrake, Sean
Sent: Monday, October 28, 2013 10:38 AM
To: 'BAYUK Dana'
Cc: Lance Peterson
Subject: FW: Gasco Revised Source Control Test Plan
Attachments: Gasco Source Control Test Plan_2013-10-17_redlines.pdf; Gasco Source Control Test Plan_2013-10-17_redlines.docx

Hi Dana,

EPA has reviewed NW Natural's October 2013 Revised Test Plan. The document incorporates the comment resolutions contained in NW Natural's response matrix table (from the 10/7 GWSCM coordination call). While the matrix table responds to DEQ comments specifically, the responses sufficiently address EPA's Test Plan comments as well. One remaining item that that EPA notes NW Natural will provide (under Section 5.1.2) is a subset list of wells to be evaluated with each control well before testing begins. This list of wells will be selected based on their location near the margins of the monitoring network (i.e., deep monitoring wells and offshore piezometers).

Let us know if you have any questions & thank you.

S

Sean Sheldrake, Unit Diving Officer, RPM
EPA Region 10, 1200 Sixth Ave., Suite 900
Seattle, WA 98101
206.553.1220 desk
206.225.6528 cell
<http://yosemite.epa.gov/r10/cleanup.nsf/sites/ptldharbor>
<http://www.epa.gov/region10/dive/>

Like us on Facebook! <https://www.facebook.com/EPADivers>

From: John Edwards [<mailto:jedwards@anchoragea.com>]
Sent: Thursday, October 17, 2013 10:21 AM
To: Dana Bayuk
Cc: Bob Wyatt; Patty Dost; Carl Stivers; Ben Hung; John Renda; Rob Ede; Rachel Martin; Michael Riley; Pradeep Mugunthan; Burr, Myron; 'Gladstone, Alan'; James Peale; 'Kerry Gallagher'; Tim Stone; Ed Berschinski; Mike Crystal; Terry Driscoll; Matt Wilson; Ben Johnson; Lance Downs; Sean Sheldrake; Peterson, Lance; Coffey, Scott; John Edwards; JOHNSON Keith; GAINER Tom; LARSEN Henning; John Edwards
Subject: RE: Gasco Revised Source Control Test Plan

Hello Dana. A PDF of the Revised Groundwater Source Control Extraction System Test Plan is attached. The revised Plan addresses DEQ and EPA's October 1 comments and reflects discussions between DEQ and Anchor QEA since October 1. Per DEQ's request the new text is highlighted to facilitate DEQ review. There are two colors of highlighted text. The red text shows the September 9 revisions, and the blue text shows the October 17 revisions. The PDF also contains the figures and tables. Table 3 was revised as explained in the text. The cross sections on Figure 3 are corrected with regard to the delineation of DNAPL. We did not resend the appendices because those have not changed since the September 9 version. We also provide the Word version of the text for DEQ convenience.

We are still trying to have things ready to start the Phase 1 Pre-test by the end of October, so if DEQ could conduct the review with that schedule in mind, we would appreciate it.

thanks

John

John E. Edwards, RG, CEG

ANCHOR QEA, LLC

*Please note new address and phone number

6364 Toohey Road
Bozeman, MT 59715

Main 406-586-8811
Cell 406-581-0877

ANCHOR QEA, LLC

www.anchorqea.com

Please consider the environment before printing this email.

This electronic message transmission contains information that may be confidential and/or privileged work product prepared in anticipation of litigation. The information is intended for the use of the individual or entity named above. If you are not the intended recipient, please be aware that any disclosure, copying distribution or use of the contents of this information is prohibited. If you have received this electronic transmission in error, please notify us by telephone at 5036701108Ext11.

From: BAYUK Dana [<mailto:BAYUK.Dana@deq.state.or.us>]

Sent: Tuesday, October 01, 2013 6:32 PM

To: John Edwards

Cc: Bob Wyatt; Patty Dost; Carl Stivers; Ben Hung; John Renda; Rob Ede; Rachel Martin; Michael Riley; Pradeep Mugunthan; Burr, Myron; 'Gladstone, Alan'; James Peale; 'Kerry Gallagher'; Tim Stone; Ed Berschinski; Mike Crystal; Terry Driscoll; Matt Wilson; Ben Johnson; Lance Downs; Sean Sheldrake; Peterson, Lance; Coffey, Scott; JOHNSON Keith; GAINER Tom; LARSEN Henning

Subject: RE: Gasco Revised Source Control Test Plan

Good afternoon John.

DEQ reviewed the "Revised Groundwater Source Control Extraction System Test Plan - NW Natural Gasco Site," dated September 2013 (received via e-mail September 9, 2013 [Revised Draft Test Plan]).

DEQ requested information for inclusion in the test plan in e-mails dated April 23, and May 15, 2013. NW Natural submitted the Draft Test Plan on August 1, 2013. DEQ and EPA provided our preliminary comments on the Draft Test Plan in e-mails dated August 12th (see below). As indicated in the August 12th e-mail, DEQ considered the Draft Test Plan to be incomplete as it lacked information needed for us to complete our review of the document. During a "workshop" on August 15th, DEQ discussed the missing content with Anchor. In addition, DEQ provided our discussion points prepared for the workshop as feedback on the sections of the Draft Test Plan.

DEQ understands NW Natural prepared the Revised Draft Test Plan in response to our comments provided in the August 12, 2013 e-mail and the August 15th workshop.

The primary purpose of this e-mail is to inform NW Natural that based on our review of the Revised Draft Test Plan; the document remains incomplete as it does not include important content previously requested and discussed during the workshop. In addition, revisions and/or clarifications DEQ understood were going to be made are not reflected in the Revised Draft Test Plan. Consequently, DEQ is requesting that the Revised Draft Test Plan be modified consistent with this e-mail and attachment.

DEQ's general comments on the Revised Draft Test Plan are provided below. The general comments are intended to provide content to complete the test plan by clarifying the hydraulic control and containment (HC&C) system testing approach. DEQ's specific comments are attached to this e-mail, in part to clarify our understandings of the workshop discussions. These comments also identify specific items in the test plan for revision.

Besides DEQ, EPA has reviewed the Revised Draft Work Plan. EPA's comments are also attached.

DEQ requests that NW Natural revise and resubmit the test plan consistent with this e-mail and the attachments. DEQ currently understands the initial testing phase (i.e., "short-term testing phase") is projected to begin in late-October. Based on this information DEQ requests the revised test plan be submitted by October 16, 2013 to provide time for our review and for potential issues, if any, to be discussed and resolved.

GENERAL COMMENTS

The Revised Draft Test continues to lack details regarding information DEQ considers to be essential for planning and conducting HC&C system testing. The most important information missing from the document includes:

- Lists of the data needs and data collection objectives for each phase of HC&C system testing;
- Discussions regarding how and when the data collection objectives of each phase of testing are anticipated to be met (i.e., decision points); and
- Details on how measurement error will be incorporated into: 1) reviews and interpretations of water level data collected during each phase of HC&C system testing; and 2) evaluations of HC&C system performance; including determinations of whether test data collection objectives have been met.

DEQ acknowledges that per the August 15th workshop discussions, the items listed above have been considered in the initial pre-test evaluation of the upper-tier of extraction wells in Segment 1. However, DEQ requested similar information to be provided for each subsequent phase of testing.

DEQ's comments provide lists of data needs and data collection objectives which address the three categories of missing information indicated above. DEQ considers the items included in each list to be necessary for completing the test plan and important for conducting the HC&C system tests. Consequently, any changes NW Natural makes to the lists should be to add items. DEQ requests that NW Natural fully integrate the lists into the next version of the test plan (e.g., into sections 2, 3, and 5).

Comment #1, Preliminary List of Data Needs. DEQ believes the HC&C system tests should provide information to address the following data needs:

- Evaluate the design objectives of the upper Alluvium WBZ extraction wells located in the portion of shoreline Segment 1 where DNAPL occurs;
- Compare and calibrate delta H settings (i.e., "set-points") at control wells with the Willamette River staff gage;
- Assess the hydraulic influence of the HC&C system on control wells, monitoring wells, observations wells, and piezometers (performance monitoring installations) throughout the performance monitoring network;
- Determine the relative hydraulic efficiency of performance monitoring installations throughout the performance monitoring network during HC&C system testing;
- Allow data collection and evaluation methods to be refined at performance monitoring installations as appropriate;
- Assess DNAPL occurrence and accumulation and removal rates before HC&C system testing (i.e., baseline conditions) with measurements made during testing;
- Inform NW Natural of adjustments that need to be made to the HC&C system during the test(s) to ensure adequate operational information is collected to support each phase of the test and full-scale full-time operation; and
- Collect data to assess the operation and hydraulic influence of the HC&C system under seasonally changing groundwater and river stage conditions.

DEQ considers the list provided above to be a starting point upon which NW Natural should expand based on their more thorough knowledge of the HC&C system design and operational details.

Comment #2, Preliminary List of Data Collection Objectives, Short-Term Testing Phase. DEQ's comments to the short-term testing phase provide NW Natural with general data collection goals and a preliminary list of specific data collection objectives. DEQ requests that data collection goals and objectives listed here be incorporated into the next version of the test plan. The general criteria for collecting data during the initial phase of testing include the following:

- Running each set-point test at least a week or longer to achieve quasi-steady state conditions between extraction wells, performance monitoring installations, and the Willamette River (i.e., sufficient time to establish water level elevation relationships and trends); and
- Collecting water level data at a sufficiently high frequency to detect subtle, short-term inflections in well hydrographs indicative of a pumping response.

DEQ's initial list of the data collection objectives is provided below and applies to each set-point test. The data collection objectives will evaluate the hydraulic influence of the HC&C system on performance monitoring installations during each set-point test by using hydrographs to:

1. Confirm the design objectives of the upper Alluvium WBZ extraction wells in shoreline Segment 1 are maintained during each set-point test;
2. Confirm that the water level elevations in the control wells are continuously lower than the river by approximately the set-point value;
3. Confirm that groundwater elevations in performance monitoring installations exhibiting "high" hydraulic efficiency are continuously more than 0.05-feet lower than the river stage;
4. Confirm that groundwater elevations in performance monitoring installations exhibiting "low" hydraulic efficiency are continuously more than 0.05-feet lower than the river stage, or consistently more than 0.05-feet lower than the river stage based on analysis of water levels using the Serfes method;
5. Confirm that the groundwater elevations in performance monitoring installations constructed below the deep aquitard clearly show the groundwater gradient is from these installations towards extraction wells;
6. Confirm that groundwater elevations in performance monitoring installations located near the margins of the HC&C system (e.g., northern and southern ends, nearshore and offshore piezometers) are continuously more than 0.05-feet lower than the river stage, or are consistently more than 0.05-feet lower than the river stage based on analysis of water levels using the Serfes method; and
7. Measure and monitor DNAPL removal rates throughout the entire initial HC&C system testing phase to assess the relationship between control well set-points and DNAPL accumulation rates.

DEQ requests the data collection objectives be used to make decisions regarding the status of set-point tests as follows:

- Subsequent to confirming objective #1 has been met, if any one of objectives #2 through #6 are not being met then NW Natural should initiate a test using a higher set-point;
- If objectives #1 through #6 are met during a set-point test, then the long-term phase of testing can be initiated at that setting.

Initiation of the phase 2 long-term test phase is subject to DEQ's approval based on our review of the supporting information provided by NW Natural.

Based on the data collection objectives listed above, DEQ requests NW Natural to add a table to the test plan that organizes installations into groups based on the anticipated response to HC&C system operation. The table should identify performance monitoring installations which NW Natural anticipates will exhibit: 1) high hydraulic efficiency; 2) low hydraulic efficiency; and 3) minimal hydraulic response (e.g., Fill WBZ installations). The table should also indicate whether the wells are screened in the upper Alluvium WBZ, lower Alluvium WBZ, Fill WBZ, below the deep aquitard, and/or at or near the margins of the performance monitoring network. The table is subject to change based on the results of HC&C system testing.

Comment #3, Preliminary List of Data Collection Objectives, Long-term Testing Phase. The primary data collection objective of the long-term testing phase is to assess the capacity of the HC&C system to achieve the first six objectives identified for the initial testing phase under seasonally changing groundwater and river stage conditions.

Comment #4, DNAPL Removal Wells. DEQ accepts NW Natural's proposal to drill and install DNAPL removal wells in the immediate vicinity of PW-11U and PW-14U. DEQ is currently reviewing Anchor's September 16, 2013 recommendations for well construction (e.g., depth, screen interval) in the context of currently available information and anticipates providing feedback in separate correspondence on Monday October 7th.

NW Natural proposes to not install a DNAPL removal well near PW-6. The Draft Revised Test Plan provides two reasons in support of the proposal: 1) lack of access for drilling and installing the well; and 2) the availability of two monitoring in the vicinity of PW-6 for DNAPL removal. DEQ does not accept NW Natural's proposal to not install a DNAPL removal well near PW-6 based on the reasons provided. Installation of this well should be the subject of further discussion and location-specific evaluations of the situation.

Comment #5, Figures 3a, 3b, and 3c, Geologic Cross-Sections. Figures 3a, 3b, and 3c in the Draft Test Plan and the Revised Draft Test Plan have apparently been modified compared with other recently submitted documents (e.g., Fill WBZ Trench Investigation Work Plan). The revisions do not appear to be mentioned in the Draft Test Plan or the Revised Draft Test Plan. At least some of the changes involve reducing DNAPL thicknesses compared to previous versions of the cross-sections. Lacking information regarding the basis for the changes and for purposes of the test plan, DEQ requests that the maximum occurrence of DNAPL and/or sheen observed in a boring be used to illustrate potential thicknesses DNAPL and/or sheen in an area of multiple borings. The cross-sections should be revised accordingly for the next version of the test plan. In addition, NW Natural should document any other changes made to the cross-sections.

Please contact me with questions regarding this e-mail and DEQ's attached comments.

Mr. Dana Bayuk, Project Manager
Cleanup & Portland Harbor Section
Oregon Department of Environmental Quality
2020 SW 4th Avenue, Suite 400
Portland, OR 97201
E-mail: bayuk.dana@deq.state.or.us
Phone: 503-229-5543
FAX: 503-229-6899

Please visit our website at <http://www.oregon.gov/DEQ/>



please consider the environment before printing this email

From: John Edwards [<mailto:jedwards@anchoragea.com>]

Sent: Monday, September 09, 2013 4:29 PM

To: BAYUK Dana

Cc: Bob Wyatt; Patty Dost; Carl Stivers; Ben Hung; John Renda; Rob Ede; Rachel Martin; Michael Riley; Pradeep Mugunthan; James Peale; Burr, Myron; Tim Stone; John Edwards; Ed Berschinski; Mike Crystal; Terry Driscoll; Matt Wilson; Ben Johnson; Lance Downs

Subject: FW: Gasco Revised Source Control Test Plan

Hello Dana. The Revised Source Control Test Plan for the Gasco project is attached for your review. As DEQ requested during the August 15 workshop, the inserted text is shown in redline to facilitate agency review. We addressed the topics raised by DEQ and EPA in the manner that was discussed during the workshop. The appendices will be sent to you in hard copy tomorrow. They include the DEQ-requested Excel spreadsheet with the Serfes calculations, so the file size is too large to email.

Please let us know how many hard and soft copies you need.

There are three information items mentioned in the text that require further action.

1. The first is a list of wells for which hydrographs will be provided as described in Section 5.1.2.
 2. The second is the recommended screen interval for the DNAPL removal wells described in Section 5.3.
- Anchor QEA will send DEQ both of these information items by September 16.

3. During the August 15 workshop DEQ offered to provide a list of the wells that the agency requests that we change the transducer measurement interval for a period of testing. This item is shown in redline on page 12 of the attached Plan. We request that DEQ provide us with the list of wells by September 16.

thanks

John

John E. Edwards, RG, CEG

ANCHOR QEA, LLC

**Please note new address and phone number*

6364 Toohey Road
Bozeman, MT 59715

Main 406-586-8811
Cell 406-581-0877

ANCHOR QEA, LLC

www.anchorqea.com

Please consider the environment before printing this email.

This electronic message transmission contains information that may be confidential and/or privileged work product prepared in anticipation of litigation. The information is intended for the use of the individual or entity named above. If you are not the intended recipient, please be aware that any disclosure, copying distribution or use of the contents of this information is prohibited. If you have received this electronic transmission in error, please notify us by telephone at 5036701108Ext11.

From: BAYUK Dana

Sent: Monday, August 12, 2013 5:04 PM

To: John Edwards

Cc: Ben Hung; 'Pradeep Mugunthan'; Michael Riley; John Renda; Carl Stivers; Rob Ede; 'Kerry Gallagher'; James Peale; 'Sheldrake, Sean'; Peterson, Lance; Scott Coffey <coffeyse@cdmsmith.com>; GAINER Tom; LARSEN Henning

Subject: NW Natural, Initial General Comments on Draft Model Update Report and Draft Test Plan

Good afternoon John.

DEQ completed preliminary reviews of the following documents:

- "Hydraulic Source Control and Containment System Groundwater Model Update Report - NW Natural Gasco Site," dated July 2013 (received via e-mail on July 29, 2013 [Draft Model Update Report]); and
- "Groundwater Source Control Extraction System Test Plan - NW Natural Gasco Site," dated August 2013 (received via e-mail August 1, 2013 [Draft Test Plan]).

Anchor QEA, LLC (Anchor) prepared both documents on behalf of NW Natural.

As requested, this e-mail provides DEQ's feedback on the documents to assist Anchor with preparing for this Thursday's (8/15) workshops. In addition, this e-mail provides our initial general comments regarding the content and completeness of the submittals. The content and completeness of the submittals is discussed first.

Please note that EPA also completed an initial review of the Draft Model Update Report and Draft Test Plan. EPA's comments are provided after my contact information. In addition to supporting DEQ's general comments, EPA's e-mail provides additional more specific comments for discussion during the workshops.

INITIAL GENERAL COMMENTS

Based on our preliminary reviews of the Model Update Report and Test Plan, DEQ concludes both documents are incomplete. The most significant information items that are lacking are mentioned below by submittal.

Draft Model Update Report

The Draft Model Update Report does not provide sufficient documentation of model development. During a meeting March 18th, DEQ requested that the Draft Model Update Report document all aspects of model development. DEQ's e-mail sent April 8, 2013 lists the information items needed to address our request. Based on DEQ's review, the Draft Model Update Report lacks the following:

- Discussions regarding the underlying assumptions and limitations associated with the model input parameters.
- Boring logs for recently drilled extraction wells and performance monitoring wells.

DEQ considers both items to be necessary for us to complete our review the Draft Model Update Report. As indicated in our 4/8/13 e-mail, DEQ believes discussions of assumptions and limitations are especially important for documenting model development.

Draft Test Plan

DEQ's request for information on the test plan is laid-out in our April 23, 2013 e-mail. In general, the Draft Test Plan does not provide the information DEQ requested in that e-mail. Based on the results of previous field testing, and our understanding of meeting discussions and correspondence, DEQ expected the Draft Test Plan to present a rigorous plan for testing the hydraulic control and containment (HC&C) system.

DEQ acknowledges that some of the information we requested is mentioned in the Draft Test Plan. However based on DEQ's review the document lacks sufficient detail regarding essential aspects of HC&C system test planning and preparation, including identification of data needs and data collection objectives, and indicating how and when during testing data collection objectives might be met (i.e., decision points).

For example, DEQ indicated a data need for HC&C system testing is to evaluate NW Natural's design objectives for the upper extraction wells located within the portion of shoreline Segment 1 where DNAPL occurs. Other than indicating these wells will be turned on 24-hours ahead of the remaining extraction wells in the HC&C system, no additional information is provided about the purpose of this initial test step and/or the objectives of operating the wells for the specified period of time or how the information will be used during the system testing to follow.

In addition, the Draft Test Plan does not consider certain comments DEQ provided previously. For example, the test plan indicates hydraulic capture offshore and of the deep Alluvium WBZ will rely on the model simulations. DEQ previously indicated this assessment should rely on water level data. In other words, water level data should be used to evaluate and/or confirm model predictions.

NEXT STEPS

As indicated above, DEQ considers the Draft Model Update Report and Draft Test Plan to be incomplete and lacking information necessary for us to complete our reviews. DEQ requests that both submittals be revised and resubmitted to include this information. DEQ will provide additional more specific comments subsequent to reviewing the revised documents.

To assist Anchor in revising the Draft Model Update Report and Draft Test Plan, DEQ proposes that the workshops focus on discussing the content the two documents should contain. With this goal in mind, DEQ proposes that Test Plan discussions focus on sections 2, 3, and most of sections 4 and 5, and discussions of the Model Update Report focus on Section 2. The starting point for these discussions will be DEQ's 4/8/13 and 5/23/13 e-mails.

Please contact me with questions regarding this e-mail.

Mr. Dana Bayuk, Project Manager
Cleanup & Portland Harbor Section
Oregon Department of Environmental Quality
2020 SW 4th Avenue, Suite 400
Portland, OR 97201
E-mail: bayuk.dana@deq.state.or.us
Phone: 503-229-5543
FAX: 503-229-6899

Please visit our website at <http://www.oregon.gov/DEQ/>



please consider the environment before printing this email

From: Sheldrake, Sean [<mailto:sheldrake.sean@epa.gov>]
Sent: Monday, August 12, 2013 10:41 AM
To: BAYUK Dana
Cc: Peterson, Lance
Subject: NW Natural, August Monthly Meeting and Source Control Workshops

Hi Dana, Here is some initial feedback – please let us know if you have any questions.

Thank you.

S

Model Update Report:

1) NW Natural should include a section in the report that explains the influences/impacts for assumptions made in the model construction/updates. To clarify, more explanation is needed to point out how model assumptions are expected to influence calibration, groundwater flow through the model layers etc. Key Specific examples include:

- * Describing the influence from assuming a no flow boundary on the South-Southeast side of the model for the lower alluvium have on model flow and how might it differ if this boundary was constant head.

- * Describing the influence to simulated groundwater discharge from the upland area when the model assumes that only the topmost model layer interfaces with the Willamette River boundary.

2) Modeling layers assigned to the wells shown on Table 1 do not make sense for PW-9-92 and PW-10L. These wells look shallower than PW-6L, which is assigned to model layer 6, but they are identified in the table as being layer 9.

3) Table 2 indicates pumping tests were not conducted at PW-7-93, yet the text on the same page suggests it was tested.

4) Section 3.2 General Approach has very confusing text in the first two paragraphs.

5) EPA's expectation is that ground water elevation contour maps and point by point comparisons between predicted and observed groundwater elevations will be carried forward and used each time the calibrated model is used to evaluate hydraulic containment.

Test Plan:

1) There appears to be a diminished level of monitoring proposed for the lower alluvium. This layer is where a major degree of uncertainty exists in terms of modeling and evaluating control of upland groundwater discharge to the river. Because of this, monitoring in this layer and the discharge pathway, which is monitored by offshore piezometers, should be increased rather than decreased.

2) The Test Plan misses the intended purpose of this document, which is to evaluate existing site data and model uncertainties before testing. Instead, the document discusses evaluating the data after the start-up testing begins. However, the purposes of this document was to use existing Segment 2 test information to develop a more informed test plan. The document is void of any such analysis and proposes this occur after testing.

3) There is an extensive discussion on monitoring and minimizing NAPL migration, but very little discussion on evaluating gradient control. There needs to be an explanation of what the Serfes method possibly ignores, such as brief periods when inward gradient conditions are not achieved and what its implications are for meeting the RAOs. It may be insignificant, but EPA needs this information and requests the concept be explained more thoroughly.

4) Section 5.2 - Assess Effects of Pumping on DNAPL is comprised of a two sentence paragraph that states what DEQ requested and then indicates what data "the analysis" will use, but does not explain the analysis. NW Natural needs to explain/illustrate (using existing or theoretical data) how these data will be used for the analysis and what it entails.

5) Section 5.4 - Uncertainty Analysis lacks sufficient explanation. This section does not explain what the implications are "if control wells are displaying time lag that is significantly higher than the other control wells"

Sean Sheldrake, Unit Diving Officer, RPM
EPA Region 10, 1200 Sixth Ave., Suite 900
Seattle, WA 98101
206.553.1220 desk
206.225.6528 cell

<http://yosemite.epa.gov/r10/cleanup.nsf/sites/ptldharbor>
<http://www.epa.gov/region10/dive/>

Like us on Facebook! <https://www.facebook.com/EPADivers>